C. E. FISHER.

BRUSH MAKING MACHINE.

APPLICATION FILED AUG. 13, 1919.

1,356,915.

Patented Oct. 26, 1920.

3 SHEETS—SHEET 1.

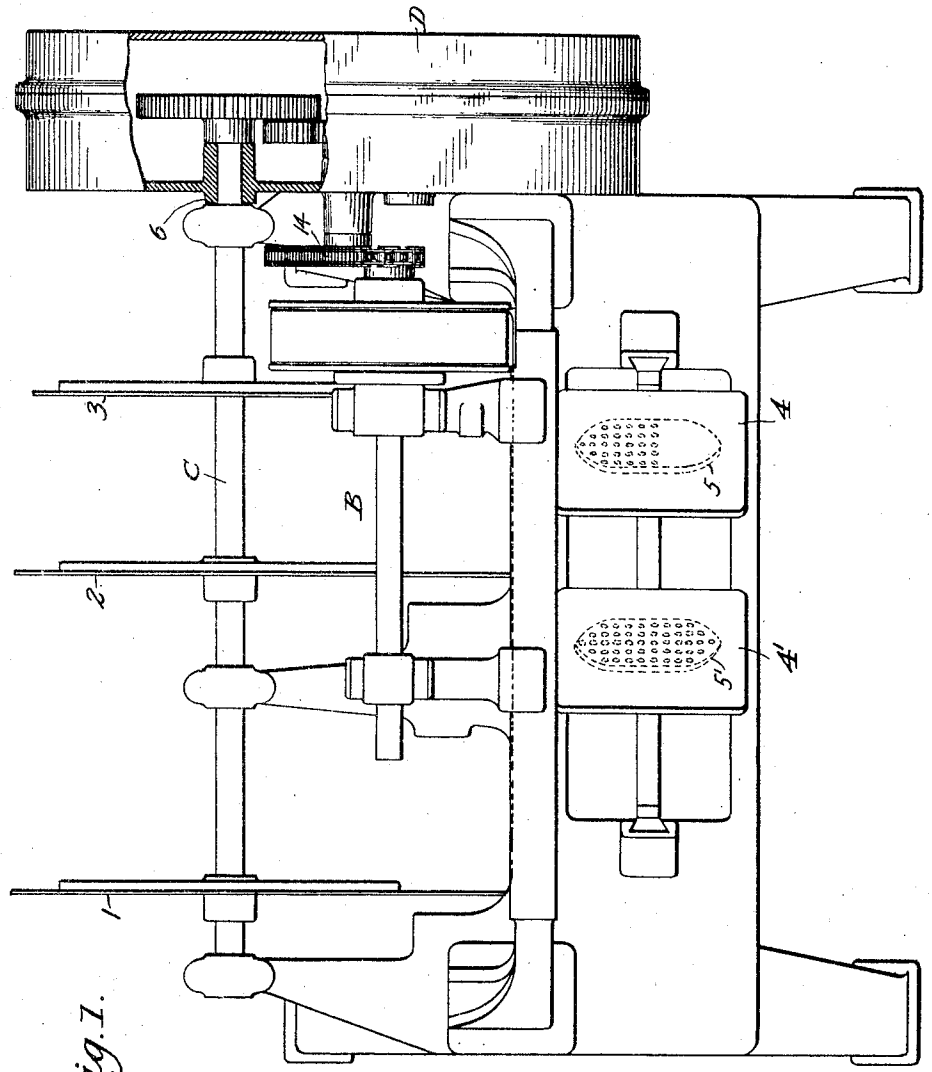


Fig. 1.

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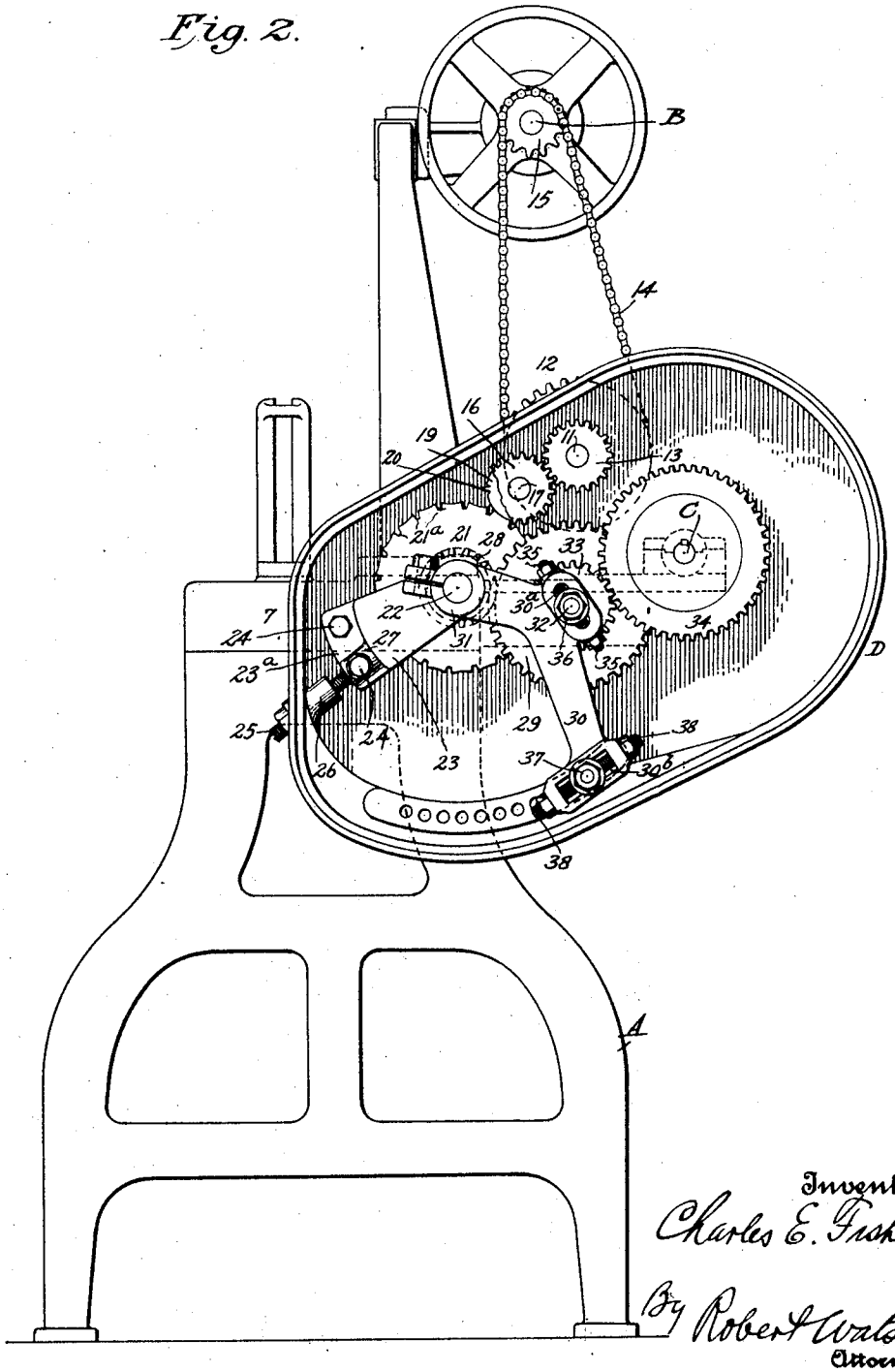
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 5.

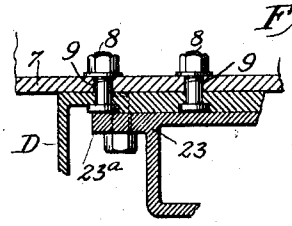
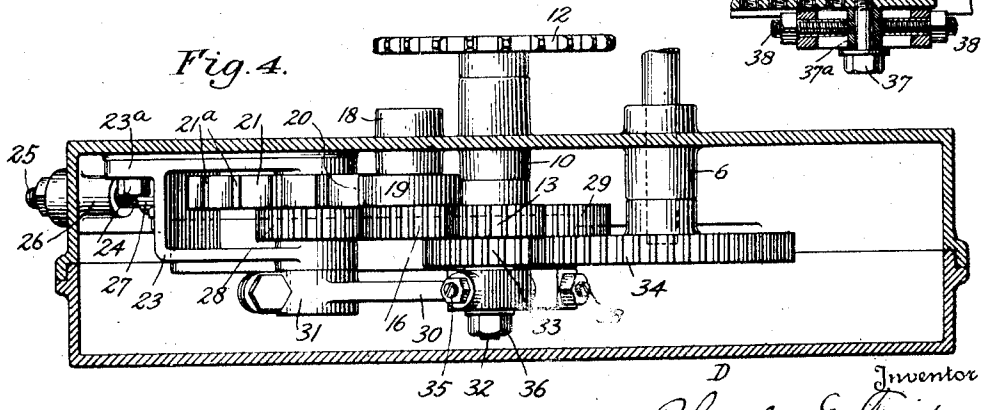


Fig. 3.

Fig. 6.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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BRUSH-MAKING MACHINE.

1,356,915. Specification of Letters Patent. Patented Oct. 26, 1920.

Application filed August 13, 1919. Serial No. 317,186.

To all whom it may concern:

Be it known that I, CHARLES E. FISHER, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Brush-Making Machines, of which the following is a specification.

This invention relates to improvements in brush-making machines of the type illustrated in patent to McClintock Young, No. 664,989, in which two brush backs are simultaneously moved and positioned beneath a boring tool and a tufting device, respectively, the boring tool operating to bore holes in one of the backs while the tufting device tacks tufts in the holes in a previously bored back.

The backs to be operated upon are placed upon a pair of tables, and through the medium of several cams on a cam shaft and intermediate mechanisms, the tables are given intermittent movements, longitudinally, laterally, and vertically, in order that the backs may be bored and the tufts applied at the proper points and at various angles to the planes of the backs. In the machine of the aforesaid patent, the movement of the cam shaft is accomplished by means of a pawl and ratchet mechanism, but, in practice, in order to prevent overrunning of the shaft, when moved by the pawl, friction and stop devices are employed and these are not always reliable or satisfactory; also, when it is desired to adjust the machine to vary the distance between the holes, it becomes necessary to change the ratchet wheel for one having a different number of teeth, and as there are, for the different styles and sizes of brushes, a great many changes to be made in the spacing, location and angles of the holes and tufts, a large number of ratchet wheels are required to effect the various changes.

The present invention is in the nature of an attachment to the machine whereby the ratchet and braking mechanisms are dispensed with and the cam shaft may be given more definite movements, of any desired extent, by means of a few interchangeable gears, thus avoiding the necessity of carrying a large assortment of the large ratchet wheels heretofore required to move the cam shaft.

In the accompanying drawing, which illustrates my invention,

Figure 1 is a plan view in outline of a part of one of the machines of the aforesaid patent, showing my improvements applied thereto;

Fig. 2 is a side elevation of the frame of the machine, with my improvements thereon, the front of the gear box being removed;

Fig. 3 is a side elevation of the gearing, the side of the gear box being removed;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a detail sectional view, taken on the line 5—5 of Fig. 3; and,

Fig. 6 is a similar view, taken on the line 6—6 of Fig. 3.

Referring to the drawing, A indicates the frame of a brush-making machine of the type heretofore referred to, B indicates the drive shaft, and C indicates the cam shaft, the latter having cams 1, 2, and 3 for giving lateral, vertical, and longitudinal movements to tables 4 and 4′, which support the brush backs 5 and 5′ while the latter are being bored and tufted. The details of the mechanism for shifting the tables and for operating the boring and tufting devices are omitted, sufficient only of the machine being shown to illustrate my invention which relates to the means for driving the cam shaft C intermittently from the drive shaft B. In the Young patent referred to, an eccentric on the shaft B operates a pawl which engages a large ratchet wheel on the cam shaft C. The mechanism of my invention takes the place of said pawl and ratchet. As shown, I provide a gear box D, which has a bearing 6 on one side fitting over the end of the cam shaft C. This gear box is bolted near one end to the side bar 7 of the frame by means of bolts 8. These bolts extend through slots 9 in the bar which are concentric with the axis of the shaft C. Thus, the gear box is supported on said shaft and is adjustable about its axis to a slight extent. On the back wall of the casing is a bearing 10, which carries a short shaft 11, and this shaft carries a sprocket wheel 12 at the rear of the casing and a pinion 13 within the casing. The sprocket wheel is connected by a chain 14 to a smaller sprocket

wheel 15 on the shaft B. By adjusting the bolts 8 in the slots 9, the casing may be swung about the shaft C to take up any slack in the chain 14 which may occur by reason of wear.

The pinion 13 is geared to a pinion 16 on a stub shaft 17, which is mounted in a bearing 18 on the back wall of the casing, and upon said shaft is secured a gear 19, having but one tooth, 20, adapted to engage the notches 21^a in a star wheel 21, the parts 19 and 21 constituting a Geneva movement. The star wheel is mounted upon a shaft 22, which is journaled in a yoke 23, the latter being secured to the back of the gear casing by bolts 24, which pass through slightly enlarged openings in a flange 23^a, extending from one side of the yoke. The yoke is adjustable, by means of an adjusting screw 25, which extends through a threaded bearing 26 in one end of the gear casing and abuts against a boss 27 on the yoke. By loosening the bolts 24 and turning the adjusting screw, the star wheel, carried by the yoke, may be adjusted toward the gear or pinion 19, to take up the wear between said parts. The shaft 22 carries a pinion 28, which meshes with a gear 29, carried by a rocker 30, the latter having a bearing 31, mounted on the shaft 22. The gear 29 is journaled upon a stud 32, and a pinion 33 is also mounted upon said stud and turns with the gear 29, said pinion 33 meshing with a gear 34 on the cam shaft C.

It will be readily seen that the intermittent movement given to the shaft 22 by the star wheel will be communicated through the gears 28, 29, 33, and 34 to the cam shaft C. The extent of movement and the number of movements of the cam shaft during one revolution thereof may be varied by substituting larger or smaller gears for one or the other, or both, of the intermediate gears 33 and 29. The gears 29 and 33 are preferably sleeved together, and similar sets of connected gears of various diameters are provided, to be substituted for the gears 29 and 33, in order to vary the movements of the cam shaft and the consequent spacing of the holes and tufts in the brush backs. For certain spacings, the gear 28, which rotates with the star wheel, will also be changed.

In order that intermediate gears of various diameters may be used and caused to mesh properly with their co-engaging gears, the rocker 30 is adjustable about the axis of the shaft 22, and the stud 32 is adjustable on the rocker. As shown, the stud 32 is secured within a slotted opening 30^a, in the rocker 30, and set screws 35, extending longitudinally in the slot, at opposite sides of the bolt, are provided for accurately positioning the stud, the nut 36 on the stud being provided for clamping the latter to the rocker after the stud has been properly positioned. The free end of the rocker has a slotted opening 30^b in which is fitted a stud or bolt 37, adapted to engage in one of a series of threaded openings 39, which are arranged in a rib in the casing in the arc of a circle whose center is the axis of the shaft 22. The stud 37 has a sleeve 37^a surrounding it, and adjusting screws 38 extend longitudinally in the slot, from either end thereof, against the sleeve which surrounds the bolt.

When it is desired to change the number of steps or movements of the cam shaft to cause a pre-determined spacing of the holes and tufts in the brush backs, one set of intermediate gears 29—33 may be removed and replaced by another set in which the diameter of one or both of the gears differs from that of the removed set, and the gears which have been substituted may be caused to mesh properly with the driving and driven gears by adjusting the position of the arm 30 and stud 32. Thus, if the substituted gear 29 remains of the same diameter while the gear 33 is larger, it will be necessary to increase the distance between the shaft C and the stud 32 in order that this larger gear may mesh with the gear 34. If a smaller gear is substituted for the gear 33, it will be necessary to adjust the support 30 to the right. As the support 30 swings about the shaft 22 on which the driving gear 28 is mounted, the adjustment of the support does not change the distance between the centers of the gears 29 and 28. For each of the different sets of gears for effecting pre-determined changes in the movements of the cam shaft, a locking hole or recess 39 is provided in the stationary part of the gear casing and the supporting arm 30 will be locked in a pre-determined position by means of the locking bolt 37 entering one of said recesses. A further adjustment of the supporting arm is provided by the adjusting screws 38, which bear against the locking pin and by means of which the pin is adjustable transversely on the arm. When the latter is in one of the recesses 39, the supporting arm may be adjusted by the set screws to adjust the meshing of the gears 33 and 34, or to vary the distance between the stud 32 and the cam shaft sufficiently to permit of the use of a slightly larger or smaller intermediate gear. For some spacings it may be necessary to substitute larger or smaller gears for the gears 28 and 29; but this does not require any adjustment of the support 30 as the distances between the centers of the gears remain the same.

It will be seen from the foregoing that the attachment is self-contained and may be readily applied to a brush machine of the kind mentioned and that a wide range of

movements of the cam shaft can be effected positively and without danger of over-running, with a relatively small number of changeable gear sets.

What I claim is:

1. In a machine of the kind described, the combination with the drive shaft, cam shaft, and a Geneva movement operated by the drive shaft, of a gear operated by said movement, a gear on the cam shaft, a support adjustable about the axis of the star wheel of said movement, two intermediate gears mounted on said support and each engaging one of said first mentioned gears, and means for locking said support in various positions of adjustment comprising a fixed part having a series of recesses concentric with the axis of the star wheel, a member of said support for engaging said recesses, and means for adjusting said member transversely of the support.

2. In a machine of the class described, the combination with the drive-shaft, cam shaft, and a Geneva movement operated by the drive shaft, of a gear operated by said movement, a gear on the cam shaft, a support adjustable about the axis of the star wheel of said movement, a stationary member having a series of spaced openings, a locking bolt on said support adapted to engage said openings, means for adjusting said bolt transversely on said support, and two gears adjustably mounted on said support and each engaging one of said first mentioned gears.

3. In a machine of the kind described, a frame, a drive shaft and a cam shaft, a gear box adjustably mounted on the frame, a Geneva movement in said box operatively connected to said drive shaft, a gear operated by said movement and a gear on said cam shaft, a support adjustable about the axis of the star wheel of said movement, two gears on said support each engaging one of said first mentioned gears, a device on said support adapted to interlock with said casing at certain points, and means for adjusting said device laterally on the support.

In testimony whereof I affix my signature.

CHARLES E. FISHER.